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Redescription and reassessment of the type material of the African centipedes *Otostigmus reichardti* Kraepelin and *Otostigmus tanganjikus* Verhoeff, with remarks on the genera *Digitipes* Attems, *Otostigmus* Porat and *Rhysida* Wood (Chilopoda: Scolopendromorpha)

by

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ABSTRACT

Otostigmus reichardti Kraepelin, 1903, exhibits all the character states of female *Digitipes katangensis* Kraus, 1957. The correct nomenclature is *Digitipes reichardti* (Kraepelin, 1903). The genus *Digitipes* should be re-evaluated. Except for its lack of spiracles on segment 7, *Otostigmus tanganjikus* Verhoeff, 1941, closely resembles *Rhysida intermedia* Attems, 1910. This calls into question the relationship between the species in *Otostigmus* and *Rhysida*.

INTRODUCTION

Only three species—all African—assigned to *Otostigmus* (subgenus *Otostigmus*), have tergite 21 alone marginate. In all the other 68 species the tergites are marginate at least from segments 17 to 21. Specimens of a fourth species having tergite 21 alone marginate, namely *Otostigmus puncticeps* Attems, 1953, from Cambodia, have been shown by Lewis (2004) to be immature *Scolopendra subspinipes* Leach, 1815.

Of the three species with tergite 21 alone marginate, *Otostigmus spinicaudus* (Newport, 1844) is widely distributed in North Africa (the Canary Islands, Morocco, Tunisia and Libya); *Otostigmus reichardti* Kraepelin, 1903, has been recorded from Tanzania, Angola and the Democratic Republic of the Congo, and *Otostigmus tanganjikus* Verhoeff, 1941, is known from a single Tanzanian specimen. *Otostigmus spinicaudus* is clearly differentiated from the other two species by the prominent dorsal spine with a large swollen base on the end leg prefemur. No dorsal spines are present on the end leg prefemora of *O. reichardti* or *O. tanganjikus.*

The type material of *Otostigmus reichardti* is redescribed and shows all the character states of female *Digitipes katangensis. Otostigmus* Porat, 1876, may prove to be the senior synonym of *Digitipes* Attems, 1930*a*, but it would be unwise to formalise this pending the examination of other African and, if possible, Indian material. To avoid confusion *O. reichardti* should in future papers be cited as *D. reichardti* comb. n.

Otostigmus tanganjikus shows strong similarities to some *Rhysida* species, but is here regarded as valid.

The following acronyms are used:

ZMHB	Zoologisches Museum, Humboldt-Universität, Berlin, Germany
ZMUH	Zoologisches Institut und Zoologisches Museum der Universität, Hamburg, Germany
ZSM	Zoologische Staatssammlung München, Germany

REDESCRIPTION OF TYPE MATERIAL

Otostigmus reichardti Kraepelin, 1903

(Figs 1–7)

Otostigmus reichardti Kraepelin, 1903: 107.

Material Examined: TANZANIA: 3 syntypes, specimens 1 (29 mm), 2 (29 mm) and 3 (incomplete, *ca* 28 mm), labelled *Otostigmus Reichardti* n. sp. [Attems spinicaudz], Kawende, R. Reichardt, (ZMHB), typus 3110; 2 syntypes, specimens 4 (28 mm) and 5 (31 mm), labelled *Otostigmus reichardti* Krpln ex typus Mus. Berlin, Kawende, Tanganyika, 20.iii.1903. and -.iv.1903, R. Reichardt (ZMUH).

Description (Kraepelin's data in parentheses where appropriate):

Maximum length 31 mm (35 mm).

Antennomeres 17 + 17, most are wider than long (Fig. 1); (from 5 on like a string of beads). Basal three almost glabrous except for distal ventromedial and medial setae on antennomere 3 (Fig. 2). A few small scattered setae on antennomeres 1 and 2. Clypeus without setae.

Claw of telopodite of second maxilla without accessory claws; second telomere without distal spine.

Forcipular coxosternal teeth four on each side, the inner two partially fused and separated from the outer two (Fig. 3). Process of forcipular femoroid with two low median cusps (Fig. 3).

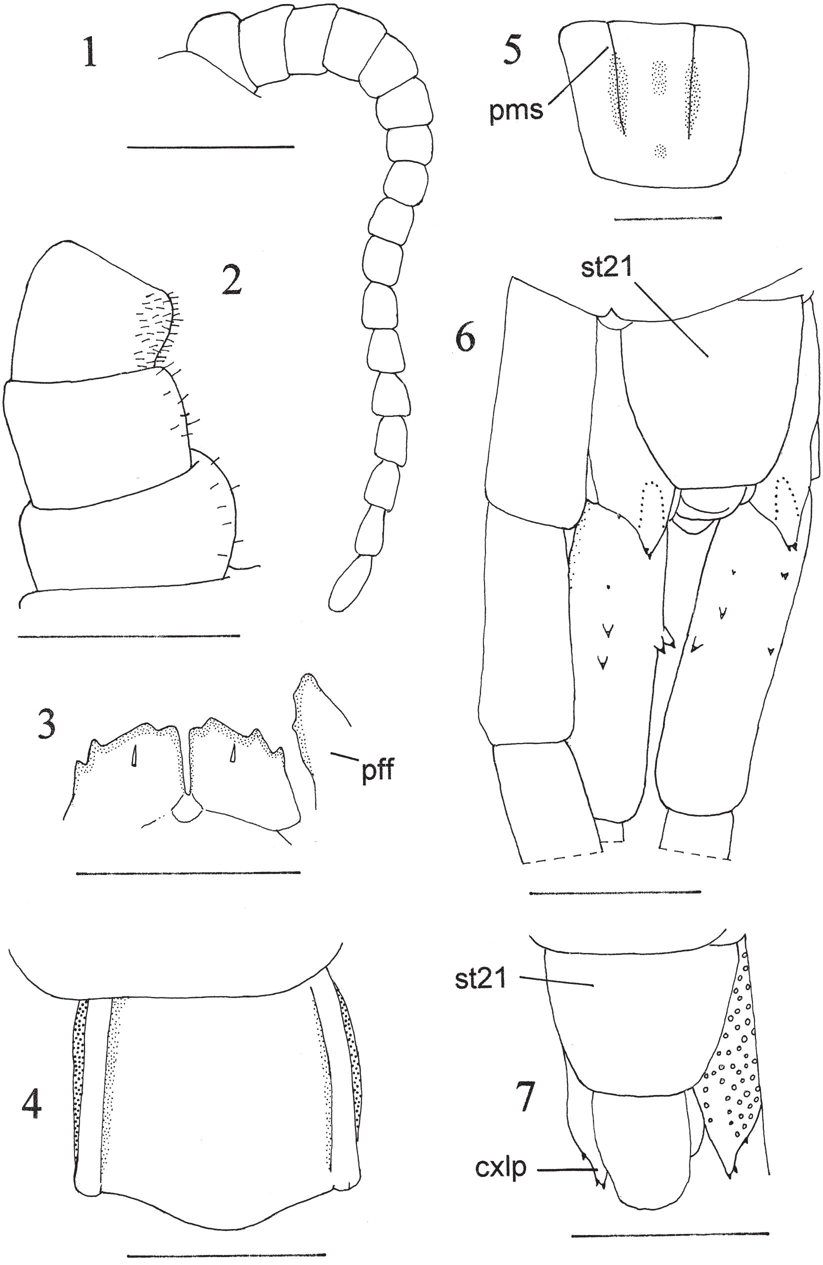
Tergites with paramedian sutures in narrow sulci complete from segments 6 to 20, but from segment 9 in specimen 4 (5 or 6). Without keels or spines. Only tergite 21 marginate and without posterior median depression (Fig. 4).

Sternites with paramedian sulci, rather than sutures, very narrow, occupying anterior 45 % on 5, 66 % on 7, 75 % on 14 in specimen 4; complete or almost so on mid trunk sternites in other specimens. With weak median oval and posterior median depressions on some sternites (Fig. 5). Sternite 21 with sides converging posteriorly, hind border straight (Fig. 6) or slightly curved (Fig. 7).

Coxopleural process short, with two end and one lateral spine (Fig. 7). End leg prefemur with two ventrolateral spines, except in specimen 4 where there are three. 1–3 ventromedials. No medial, dorsomedial or corner spines. Spines positioned in proximal half of prefemur (Fig. 6). Specimens 2 and 3 lack end legs. No distal lobe or process on femur.

Leg 1 with one femoral and one tibial spine, legs 1 and 2 and possibly 3 with two tarsal spines. One tarsal spine on the subsequent legs to segment 19. Legs 20 and 21 lack a tarsal spine (legs at most with two tarsal spines on segments 1 and 2, 20 and 21 without).

Spiracle on segment 3 small, oval, the following spiracles very small and difficult to discern, but careful examination shows spiracles absent on segment 7, but present on 8.



Figs 1–7. *Otostigmus reichardti* Kraepelin, 1903, syntypes. **1**. Right antenna, specimen 5. **2**. Left antennomeres 1–3, ventral, specimen 5. **3**. Forcipular coxosternal toothplates and process of left forcipular femoroid, specimen 1 (pff = process of forcipular femoroid). **4**. Tergite 21, specimen 5 (pms = paramedian sutures). **5**. Sternite 15, specimen 4. **6**. Terminal segments and end leg prefemora, ventral view, specimen 4, coxopleural pores not shown (st21 = sternite 21). **7**. Terminal segments, ventral view, specimen 1, coxopleural pores shown on left only (st21 = sternite 21, cxlp = coxopleural process). Scale line = 1.0 mm, except Figs 2 & 3 (= 0.5 mm).

Remarks: In addition to Kawende, Tanzania, *Otostigmus reichardti* has been recorded from Dundo, Angola (Chamberlin 1951) and Elisabethville (now Lubumbashi), Katanga Province, Democratic Republic of the Congo (Attems 1930*b*) and again from Elisabethville as *Cormocephalus reichardti* Kraepelin by Attems (1937). *Otostigmus reichardti* keys out as *Digitipes verdascens* Attems, 1930, from Katanga in Attems' (1930*a*) key. It was then the only described species. Attems (1930*b*) described *Digitipes* gen. n. *verdascens* sp. n., but this was pre-dated by his description in *Das Tierreich* (Attems 1930*a*). He separated *Digitipes* from *Otostigmus* by the possession of a cylindrical process on the end leg femur of males, the second maxilla lacking accessory claws and the second telopodite lacking a spine in *Digitipes*. The three syntypes of *O. reichardti* with end legs do not show the cylindrical process on the end leg femora and are presumably females.

Two further species of *Digitipes* have been described from Africa, namely *D. katangensis* Kraus, 1957, and *Digitipes krausi* Dobroruka, 1968. *Digitipes katangensis* has been recorded from a number of localities in Katanga (Kraus 1957 1958; Dobroruka 1968; Goffinet 1969) and from one in Tanzania (Kraus 1957). *Digitipes katangensis* differs from *D. verdascens* in having a side spine on the coxopleuron, a blunt cone rather than a cylindrical process on the femora of the end legs, and the hind wall of sternite 21 being weakly concave rather than convex (Kraus 1957). Material of *Digitipes krausi* recorded from Dekese, Kasai Province, Democratic Republic of the Congo, appears to be quite distinct from the two foregoing species and warrants re-examination. Only the female has been described.

Kraepelin's syntype material of *O. reichardti,* redescribed here, is virtually identical to female *D. katangensis* (Table 1) and the species are clearly conspecific. As *reichardti* is the senior specific synonym, the correct nomenclature is *Digitipes*

TABLE 1.

Comparison of character states in *Otostigmus reichardti, Digitipes katangensis*, *Otostigmus tanjanikus* and *Rhysida intermedia.* The numbers in parentheses are exceptions.

	O. reichardti	*D. katangensis*	*O. tanganjikus*	*R. intermedia*
Antennomeres	17	16 (17)	20	19
glabrous dorsally	3	3	3	3
Coxopleural teeth	4+4	4+4	4+4	4+4
Tergites marginate	21	21	21	21
Sternite				
paramedian sutures	± complete	present	very short	very short
Coxopleura				
end spines	2	2	3	3
lateral spines	1	1	0/1	0
dorsal spines	0	0	0	0
End leg prefemora				
ventrolateral spines	2(3)	2(3)	2	2
ventromedial	1–3	2(3)	1	1
Legs with 2 tarsal spines	1–2(3)	1–4	1–3/4	1–15

reichardti (Kraepelin, 1903) comb. n. *Otostigmus* Porat, 1876 may prove to be the senior synonym of *Digitipes* Attems, 1930*a*, but it would be unwise to formalise this pending the examination of other African and, if possible, Indian material.

Whilst male *Digitipes* can easily be recognised based on the structure of the end leg femora, the situation for females is problematic. The reason for this is the variability of the key second maxillary characters in *Otostigmus*. Thus Verhoeff (1941) noted that the accessory claw of the second maxilla is straight and clearly shorter than the main claw in *O. tanganjikus*, whereas in *O. spinosus* Porat, 1876, it is curved and almost as long as the main claw. In *O. striolatus* Verhoeff, 1937, and *O. demelloi* Verhoeff, 1937, however, the accessory claw is rudimentary. Furthermore, Schileyko (1995) reported that in *O. reservatus* Schileyko, 1995 - 'the absence of a distal spur of the segment 2 of the second maxilla appears to be unique in *Otostigmus* marking this species. This reduces the gap between the genera *Otostigmus* and *Digitipes* Attems, 1930. But sometimes these spurs are nearly transparent and almost invisible in related species.' It is clearly unsatisfactory that, at least for females, the distinction between the genera should rest on two highly variable characters. The relationship between *Otostigmus* and species of *Digitipes*—including six diverse species of *Digitipes* described from India by Jangi & Dass (1984)—should thus be examined.

Otostigmus tanganjikus Verhoeff, 1941

(Figs 8–14)

Otostigmus tanganjikus Verhoeff, 1941: 200, Abb. 4–6.

Material examined: TANZANIA: Two slides labelled *Otostigmus tanganjikus* Verh. Tanganyika. Slide 1: head, antennae, mandibles, maxillae, forcipular segment and first four trunk segments. Slide 2: segments 19 to 21, two detached end legs and another, probably leg 20 (ZSM). The holotype by monotypy. Verhoeff (1941) gives the locality as Morogoro.

Description (Verhoeff's data in parentheses where appropriate):

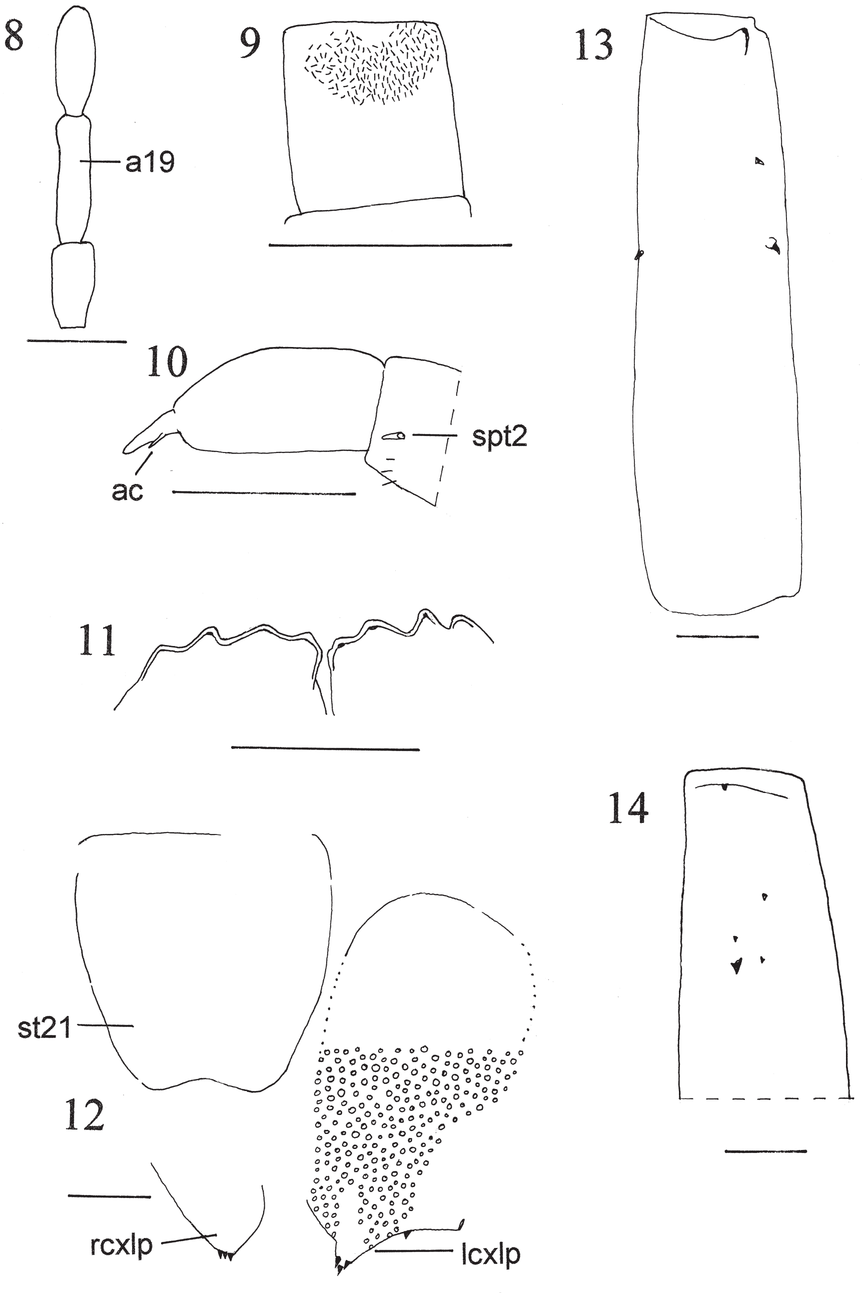
(Body length 50 mm).

The left antenna, with 19 antennomeres, is damaged. The right has 20 antennomeres with a long antennomere 19 (Fig. 8), suggesting that this antennomere had elongated but failed to divide. Basal three antennomeres glabrous dorsally but only the basal 2.6 glabrous ventrally (Fig. 9) (2+ basal segments glabrous).

Claw of second maxillary telopodite with accessory claw; second telomere with a weak spine (Fig. 10). Forcipular coxosternal toothplate with 4 + 4 teeth (Fig. 11). Process of forcipular femoroid short with one or two very low inner cusps.

(Some tergites without or with only very short posterior paramedian sutures. Tergite 21 marginate. Sternites without sutures ('furchen') at most with some very short indication). Sternite 21 with sides converging posteriorly and hind border concave (Fig. 12).

Coxopleural process short, with three end spines and, on the left, a lateral spine. Pore field with small pore-free median ventral strip (Fig. 12). Right end leg prefemur with two ventrolateral spines and one ventromedial (Fig. 13), the left—which is probably



Figs 8–14. *Otostigmus tanganjikus* Verhoeff, 1941, holotype. **8**. Left antennomeres 18–20 (a19 = antennomere 19). **9**. Antennomere 3, ventral. **10**. Second maxilla, telopodites 2 & 3, ventral (ac = accessory claw, spt2 = spine on telomere 2). **11**. Forcipular coxosternal toothplates. **12**. Sternite 21 and coxopleura, pores shown only on distal half of left coxopleuron (st21 = sternite 21, rcxlp = right coxopleural process, lcxlp = left coxopleural process). **13**. Right end leg prefemur, ventral. **14**. Left end leg prefemur, ventral. Scale line = 0.5mm.

regenerated—with four ventrolaterals (Fig. 14). Spines positioned in proximal half of prefemur. (Two tarsal spines on legs 1 to 3 or 4, leg 19 with one), legs 20 and 21 without tarsal spines.

Remarks: *Otostigmus tanganjikus* shows striking similarities to *Rhysida intermedia* Attems, 1910, from Pemba Island, Tanzania (Table 1). They differ in that *O. tanganjikus* has two tarsal spines on the first three or four pairs of legs only and lacks spiracles on segment 7. *Rhysida intermedia* has two tarsal spines on the first 15 pairs of legs and spiracles present on segment 7. The number of legs with two tarsal spines is, however, a variable character. In the closely related *R. afra* (Peters, 1855) the number of legs with two tarsal spines varies from the first five to the first 18 pairs, so the difference is not significant. This leaves the presence or absence of spiracles on segment 7 as the only character separating the two species. Verhoeff's preparations do not include all the trunk segments so it was not possible to check the presence or absence of a spiracle on segment 7. If it is assumed that he was correct and these spiracles were absent in his specimen of *O. tanganjikus*, then the similarities between some *Otostigmus* and some *Rhysida* species are such that these genera need to be reassessed. If this was not the case and spiracles were present on segment 7, then *O. tanganjikus* would be conspecific with *R. intermedia* and perhaps *R. afra*. The situation was noted by Kraepelin (1903), who wrote of *Rhysida*: 'the species of this genus possess the Habitus of the genus *Otostigmus* associated with the same forms and differentiated solely by the spiracle on segment 7'.

There appear to be no records of a species normally with spiracles on segment 7 in which some specimens abnormally lack them, but Crabill (1955) recorded the opposite phenomenon in a specimen of *Scolopocryptops sexspinosus* (Say, 1821). This had poorly developed spiracles on segment 7. *Scolopocryptops* is a genus that does not have spiracles on that body segment.

I have no doubt that the relationships between the species of *Otostigmus* and *Rhysida* need to be reassessed, but until then it is probably best to treat *O. tanganjikus* as a valid name.

SUMMARY

Digitipes katangensis is newly synonymised with *O. reichardti*; the valid combination being *D. reichardti* (Kraepelin, 1903). The genus *Digitipes* requires revision. *Otostigmus tanganjikus,* apart from lacking spiracles on segment 7, is very similar to *Rhysida intermedia*. The relationships of the species of *Otostigmus* and *Rhysida* should be re-examined.

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